

### **REMARKS/ARGUMENTS**

Favorable reconsideration of this application, as presently amended and in light of the following discussion is respectfully requested.

Claims 1-20 are pending in this application. Claims 21 and 22 are added by the present amendment. Support for new dependent Claims 21 and 22 can be found in the original specification, claims and drawings. No new matter is presented.<sup>1</sup>

In the outstanding Office Action, Claims 1 and 11 were rejected under 35 U.S.C. 103(a) as unpatentable over Negrelli et al. (U.S. Patent No. 5,712,895, herein "Negrelli") in view of Strobel (U.S. Patent No. 6,650,724); Claims 6 and 16 were rejected under 35 U.S.C. 103(a) as unpatentable over Negrelli in view of Strobel and in further view of Ohishi (U.S. Patent 6,845,142); Claims 2-5 and 12-15 were rejected under 35 U.S.C. 103(a) as unpatentable over Negrelli in view of Strobel and in further view of Vining (U.S. Patent No. 5,782,762); and Claims 7-10 and 17-20 were rejected under 35 U.S.C. 103(a) as unpatentable over Negrelli in view of Strobel, Ohishi, and Vining.

Applicant respectfully requests reconsideration of the rejection under 35 U.S.C. §103(a), and traverses the rejection, as discussed next.

Applicant's independent Claim 1 relates to a 3D image processing apparatus , comprising *inter alia*:

***...a first subtracting unit configured to generate data of a plurality of subtraction images*** by subtracting the plurality of mask images from the plurality of contrast images;  
a reconstruction unit configured to reconstruct first volume data from the plurality of contrast images and configured to reconstruct second volume data from the plurality of subtraction images;  
***a second subtracting unit configured to generate mask volume data by subtracting the second volume data*** from the first volume data,

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<sup>1</sup> E.g., specification, Figs 3A-3B, and p. 7, line 5-p. 8, line 11.

an image processing unit configured to generate data of a first 3D image representing a bone structure and/or a soft tissue structure from the mask volume data, and configured to generate data of a second 3D image representing a contrasted blood vessel from the second volume data...

Independent Claim 11 recites substantially similar features. Accordingly the arguments presented below are applicable to both independent Claims 1 and 11.

As explained in Applicant's specification from page 1, line 27, to page 2, line 2, Applicant's Claim 1 improves upon background 3D image processing apparatuses by separating blood vessels from the bones clearly, and displaying blood vessels in high definition.

Turning now to the applied references, Negrelli discloses a rotational digital subtraction angiography system, wherein a test phantom is used for a calibration procedure.<sup>2</sup> Negrelli further explains that the calibration system includes a subtraction circuit for generating a subtracted image between the forward sweep rotation image and the corresponding reverse sweep rotation image.<sup>3</sup>

As argued in the remarks presented May 5, 2006, however, Negrelli fails to teach or suggest the first *and second* subtraction units, as recited in independent Claim 1.

In response to these arguments, the outstanding Official Action states that it would have been obvious to a person of ordinary skill in the art to modify the teachings of Negrelli at col. 2, lines 55-60, to obtain the first and second subtraction units, as claimed. Specifically, the outstanding Official Action argues that because Negrelli teaches a subtraction/overlay circuit for generating a subtracted image between the forward sweep rotation image and the corresponding reverse sweep rotation image, it would have been

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<sup>2</sup> Negrelli, col. 1, lines 5-12 and lines 55-67.

<sup>3</sup> Id., col. 2, lines 55-60, from col. 5, line 66, to col. 6, line 2, and in Fig. 1, item 86.

obvious to provide such for any two sets of data to generate data of interest.<sup>4</sup> The outstanding Office Action further argues that it is proper to combine Negrelli with the teachings of Strobel, to include the reconstruction method using volume data sets from 2D mask images.

Applicant, however, respectfully traverses these assertions as the claimed first and second subtraction units, and their functional relationships, is not an obvious modification based on the Negrelli and Strobel references.

The applied references do not teach or suggest the functional relationships “a first subtraction unit configured to generate data of a plurality of subtraction images,” and “a second subtraction configured to generate mask volume data by subtracting the second volume data,” as recited in independent Claim 1. Therefore, it appears that the outstanding Office Action is attempting to employ improper hindsight in rejecting Applicant’s independent claims.<sup>5</sup>

As admitted in the outstanding Official Action, Negrelli fails to teach or suggest a first subtracting unit configured to generate data of a plurality of subtraction images *by subtracting the plurality of mask images from the plurality of contrast images*. P. 10 of the outstanding Official Action attempts to remedy this deficiency of Negrelli, as suggesting that such a calculation would have been obvious to one of ordinary skill in the art. However, the outstanding Official Action fails to provide cite any motivation or suggestion in the applied references for such a modification of Negrelli.

As discussed above, and as noted in the specification, the claimed use of a plurality of subtraction units and a reconstruction unit results in the generation of a synthetic image of bone structure/soft tissue and blood vessels, which is superior to that described in Negrelli. Also, Negrelli fails to provide, nor does the outstanding Official Action cite any motivation to

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<sup>4</sup> Outstanding Office Action, p. 10, lines 26-20, citing Negrelli at col. 2, lines 55-60.

<sup>5</sup> See MPEP 2141, stating, as one of the tenets of patent law applying to 35 USC 103, that “[t]he references must be viewed without the benefit of impermissible hindsight vision afforded by the claimed invention.”

modify his device to generate data of a plurality of subtraction images *by subtracting the plurality of mask images from the plurality of contrast images*, as recited in independent Claim 1.

Further, independent Claim 1 recites a reconstruction unit that reconstructs “first volume data from the plurality of contrast images” and “second volume data from the plurality of subtraction images.” As admitted in the outstanding Official Action<sup>6</sup>, Negrelli fails to teach or suggest this reconstruction unit feature.

In addressing this claimed feature, the outstanding Official Action relies on Strobel, and asserts that this reference describes “a reconstruction of a first set of volume data produced from mask images and a second set of volume data produced from... contrast images.”<sup>7</sup> Thus, the outstanding Official Action asserts that Strobel describes reconstruction based on mask images and contrast images, not *from the plurality of subtraction images*, as recited in independent Claim 1. Therefore, Strobel fails to teach or suggest the claimed “reconstruction unit” feature, and the functions associated therewith, as recited in independent Claim 1.

Further, the outstanding Official Action states that “it would have been obvious to generate mask volume data by subtracting the contrast and subtraction volume data taught by Strobel using the subtraction unit taught by Negrelli...” However, as noted above, Strobel fails to teach or suggest generating subtraction volume data *from the plurality of subtraction images*. Instead, as discussed at p. 11, lines 1-3 of the outstanding Official Action, Strobel calculates subtraction data by determining the difference between the 2-D mask images (V1 and V2). Thus, at no point does Strobel teach or suggest generating “subtraction volume data” by subtracting mask images from contrast images, as recited in independent Claim 1.

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<sup>6</sup> Outstanding Official Action, p. 3, lines 13-16.

<sup>7</sup> Id., p. 3, lines 16-19.

Therefore, even if the combination of Negrelli and Strobel is assumed to be proper, the combination fails to teach, or render obvious, every element of the claimed invention. Specifically, the combination fails to teach the claimed first and second subtraction units, and reconstruction unit. Accordingly, Applicant respectfully traverses, and requests reconsideration of, the rejection of Claims 1 and 11 based on these patents.<sup>8</sup>

Claims 6 and 16 were rejected under 35 U.S.C. 103(a) as unpatentable over Negrelli in view of Strobel and in further view of Ohishi. Applicant notes that Ohishi qualifies as prior art under 35 U.S.C. §102(e), as the present application filing date predates the issue date of Ohishi. To the extent the rejections above apply to the present claims, Applicant respectfully traverses the rejections.

As Ohishi is 102(e) art, the obviousness rejection is deficient under 35 U.S.C. §103(c) as explained below.

Applicants submit that the present application and the Ohishi reference were, at the time the invention was made, owned by, or subject to an obligation of assignment to Kabushiki Kaisha Toshiba Corporation. Accordingly, application of the Ohishi reference in this obviousness rejection is improper, as Ohishi may not be applied as a basis for supporting a prima facie case of obviousness as outlined by 35 U.S.C. §103(c).<sup>9</sup>

Accordingly, Applicants respectfully request that the rejection of Claims 6 and 16 under 35 U.S.C. 103(a) be withdrawn.

Further, new dependent Claims 21 and 22 recite a "calibration unit" feature similar to the feature recited in independent Claims 6 and 16 for which Ohishi is relied upon.

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<sup>8</sup> See MPEP 2142 stating, as one of the three "basic criteria [that] must be met" in order to establish a *prima facie* case of obviousness, that "the prior art reference (or references when combined) must teach or suggest all the claim limitations," (emphasis added). See also MPEP 2143.03: "All words in a claim must be considered in judging the patentability of that claim against the prior art."

<sup>9</sup> Applicant notes that the filing date of the present application is after November 29, 1999, therefore bringing the present application under the current guidelines for 35 U.S.C. §103(c) for excluding 102(e) art.

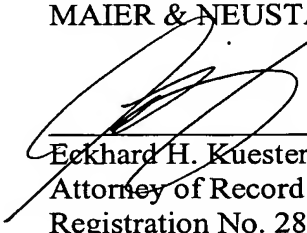
Accordingly, Applicant submits that new Claims 21 and 22 also patentably define over the applied references.

The reference Vining, relied upon by the outstanding Office Action to form a 35 U.S.C. §103(a) rejection of the dependent claims, does also not remedy the deficiencies of Negrelli and Strobel. Vining is merely concerned with 3D graphics rendering for selected body organs,<sup>10</sup> and does not teach or suggest anything regarding a first and second subtraction unit (Claims 1 and 11) or a calibration unit (Claims 6 and 16). Therefore, Applicant respectfully traverses the rejection of the dependent claims, and requests reconsideration of the rejection.

Consequently, in view of the present amendment, no further issues are believed to be outstanding in the present application, and the present application is believed to be in condition for formal Allowance. A Notice of Allowance for Claims 1-22 is earnestly solicited.

Respectfully submitted,

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<sup>10</sup> Vining, Abstract.